REVIEWER'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Development of a virtual toolchain for Toyota Hybrid System powertrain NV assessment**
Author's name:	**Bc. Ivo Vodicka**
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	Dr. Satrio Wicaksono
Reviewer's department:	Mechanical Engineering, Institut Teknologi Bandung

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

Evaluation of thesis difficulty of assignment.

I believe that to finish the current thesis is challenging as the modelling difficulty is quite high and the setup of the experimental validation need to be performed carefully and correctly. Based on the modelling and experimental explanation as well as the results shown in this thesis, it is shown that the modelling and the experiment were performed correctly.

Satisfaction of assignment **fulfilled**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

Assessment of three main scopes of the current thesis:

- Getting familiar with the problem of NV in THS: presented very well in the thesis (fulfilled)
- Developing toolchain model for booming noise prediction: the modelling was performed decently and several improvements were done as well (fulfilled).
- Experimental validation: the experiment was properly setup and done (fulfilled).

In general, the toolchain model that was developed can be very useful to Toyota to predict its Hybrid car NV and reducing the experiment that need to be performed, which shows the importance of the current thesis.

Method of conception **correct**

Assess that student has chosen correct approach or solution methods.

The approach used in the current thesis is correct. In order to predict the NV virtually, toolchain model was developed. Additionally, in order to confirm the accuracy of the model, experimental validation was performed.

Technical level **A - excellent.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

The technical level of the current thesis is high especially in the area of NV prediction. The literature review was well performed, which gave great knowledge gain to the author. Additionally, the experience of doing the proper experiment will be very useful to the author in the future as well.

Formal and language level, scope of thesis **B - very good.**

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The thesis was well written with very minimal grammatical and typographical errors. Additionally, the chosen language and the thesis flow was very good.

Selection of sources, citation correctness **B - very good.**

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished

from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.
All of the references used in the thesis are relevant to the topic. No breaching of citation ethics was evidenced in the thesis. Additionally, the bibliographic citations were properly done as well.

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
The primary goals of the current thesis were properly achieved and the toolchain model results may be applied directly in the industry (Toyota).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

- How to further improve the current model?

I evaluate handed thesis with classification grade **A - excellent.**

Date: **27.1.2020**

Signature: